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this distrust of the speculative and theoretical and in spite of the imposing array of terms and principles to describe social phenomena the book often gives the impression that we are still dealing with the impulses, contacts and interests of individuals. The writer fails to impress upon the reader that there is a social as opposed to an individual reality, as is done so skilfully in the works of Cooley. Even in the last part, devoted to "sociological principles," these principles are merely generalizations drawn from the facts. There is little attempt to relate these principles to each other or to a general voluntaristic point of view. The discussion of "Anticipation" (ch. 44), for example, a characterization of the growing purposefulness of society, is obviously related to the teleological implications of the basic social forces of instinct and interest and yet no attempt is made to indicate this relation. The last principle of "Balance" (ch. 47), defined as follows: "In the guidance of society each social element should share according to the intelligence and public spirit of its members *and none should dominate*" (p. 693), is a meaningless truism without further light as to our ideal of what society should be. This unwillingness to think things through even at the risk of landing in philosophy makes the book often tedious reading in spite of its wealth of concrete and piquant details.

Ross's *Principles of Sociology* will hardly take its place as a permanent contribution to social theory, it will hardly be in demand as a compendium of social facts scientifically arranged nor yet as a handbook for the reformer, though philosopher, scientist and reformer may find here both information and inspiration. The book will be prized for its wealth of information, its suggestive insights into phases of social reality and its vivid style. It is a question, however, whether Professor Ross's fame will not be furthered less by this bulky volume than by his earlier more incisive if less ambitious writings such as *Social Control*, *Sin and Society* and *Changing America*. It may be that his most lasting contribution will not be as a social philosopher but rather as the brilliant analyst of a changing world order and the fearless castigator of our modern high-power sinners.

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General Principle of Relativity: H. W. CARR. London: Macmillan & Co. 1920.

Space and Time in Contemporary Physics: MORITZ SCHLICK. Translated by H. L. Brose. Oxford University Press. 1920.

On Gravitation and Relativity: R. A. SAMPSON. (The Halley Lecture.) Oxford University Press. 1920.

Carr states in his preface that he deals only with the philosophical and historical aspects of the principle of relativity (the main ideas were developed in a course of lectures on "Historical Theories of Space, Time and Movement," delivered at King's College in the spring of 1920); but in fact, as one reads the book, one finds that a large proportion of it is actually devoted to an exposition, of course in popular language, of the mathematical and physical aspects of the Einstein theory, mainly the special theory of relativity.

This exposition is well written, but it will hardly make the theory clear to a reader who is not already familiar with it; and a number of actual misstatements can be pointed out. On page 35 it is stated that "in an infinite series no two members are next one another, for between any two there is always another." This is stated as a general proposition and of course is not true; some infinite sets have next members like the series of integers. Others do not enjoy this property like the continuum of points of a line.

On page 138 the author is evidently confused by the concept of *event*, since he talks about an infinite set of events as if it were a single event, which is just as bad as not differentiating between a single point and a curve.

The statement on page 77 dealing with the Einstein principle of *equivalence* refers merely to the trivial fact that when *A* moves toward *B*, *B* may be regarded as moving toward *A*; the true principle in fact has nothing to do with the special theory of relativity but deals with the connection between gravitation fields and acceleration fields.

The best part of the book is the historical accounts of "Atoms and the Voids" in Chapter 3 and of the "Vortex Theory" in Chapter 4, precisely the parts that have least to do with Einstein.

The general theory of relativity which is at the basis of Einstein's solution of the problem of gravitation is hardly touched on by the author—in spite of the title of the book. The concepts of curvilinear coördinates, curvature, and tensor, can not be grasped without a good deal of serious mathematical thinking, and without them it is impossible to understand the Einstein theory.

The last chapter of Carr is entitled "In What Sense is the Universe Infinite?" It does not make clear the fundamental fact that we must distinguish between the infinity of space and the unboundedness of space. This essential point is very well presented in the ninth chapter of Schlick's book (a chapter added to the second edition). Another fine chapter of Schlick's deals with the "Inseparability of Geometry and Physics in Experience." On page 73, however, the

reader is left entirely in the dark as to the distinction between spherical and elliptical spaces. If the reader relies on etymology or what he has picked up in elementary college mathematics, he is bound to have an entirely false impression of the true state of affairs and Schlick's discussion will not help him out of his difficulty. Schlick goes much further than Carr in both mathematics and physics, but neither goes far enough to reach a clear statement of Einstein's law of gravitation.

Sampson's brief lecture is more interesting for its classical quotations and sarcastic point of view than for the light it throws on Einstein.

For the philosopher who wishes to get in closer contact with relativity, the reviewer would recommend Einstein's popular book, Eddington's *Space, Time and Gravitation*, and Born's *Relativitätstheorie Einsteins*. For the mathematical reader, who wishes to reach the fundamentals, there is no rival to Weyl's *Raum, Zeit, Materie*, which has not yet been translated into English. (Weyl and Eddington have now been translated into French, with valuable additional material.) The most interesting exposition of Einstein written by a philosopher, is that contained in Viscount Haldane's new book, *The Reign of Relativity*, his attitude toward mathematics being finely expressed as follows:

"What I have ventured to say must be taken as pretending to record no more than it does, the impressions of a non-mathematician about what the mathematicians are saying to each other when they enter the borderland of philosophy and speak about it among themselves. The impression is that of a stranger in whose presence they talk, but who, although keenly interested in learning from them, is but imperfectly acquainted with a language which to them is one of second nature. They may, therefore, be gentle with him if his accent seems strange and his capacity to do justice to their words appears inadequate. His reason for listening and in his turn making comments does not appear to be an irrelevant one. They are in a territory that is occupied in common, and forbearance on both sides is therefore necessary. I do not believe that the fundamental conceptions are as obscure as some of the mathematicians take them to be. The reason they seem so is that they are concerned with matters which involve consideration of a more than merely mathematical character. For the rest I am not lacking in admiration for the splendid power of the instruments the mathematicians possess, and the wonderful results they have achieved with them; instruments which impress me not the less because it is beyond my powers to wield them."

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